

Experiences with a National Greenhouse Gas Inventory System

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ABSTRACT

The Federal Environment Agency Austria has been aware of the importance of quality during the compilation of an emission inventory since many years. Along with the UNFCCC and the Kyoto Protocol more stringent requirements on the compilation of greenhouse gas emission inventories have to be fulfilled as precondition for any kind of flexible mechanism.

Therefore Austria is taking significant steps to ensure a high-quality emission inventory in which uncertainties are reduced as far as feasible and in which data are developed in a transparent, consistent, complete, comparable and accurate manner. Details are provided with respect to:

- Adaption of the national system according to Article 5.1 of the Kyoto Protocol
- Quality management system
- Uncertainty analysis
- Identification of key source categories

The national system is planned to be adapted according to Article 5.1 of the Kyoto Protocol until 2003. It will include all institutions whose data have a significant impact on the emission inventory.

The implementation of a quality management system started in 1999 and will result in the accreditation as inspection body in 2002. The quality management system is based on the EN 45000 series and obliges inspection bodies to strict independence, impartiality and integrity in their activities. Apart from the requirements of this standard all relevant requirements arising from the Good Practice Report are included as well.

The analysis of uncertainties and of key source categories has been started as a basis for the inventory improvement program. The results will lead to a change of method for the estimation of emissions if the requirements of the Good Practice Report are not met.

INTRODUCTION

Regulations under the United Nations Framework Convention on Climate Change (UNFCCC) [1] and the Kyoto Protocol [2] define new standards for national emission inventories. These standards include more stringent requirements related to transparency, consistency, comparability, completeness and accuracy of inventories. Higher-quality emission data will be a precondition for any kind of flexible mechanism as introduced by the Kyoto Protocol.

As Austria anticipates the Kyoto Protocol to enter into force in the near future it prepares itself for all requirements coming along with it. The following steps have already been made:

- Design of a concept for an adaption of the national system according to Article 5.1 of the Kyoto Protocol
- Development of a quality management system
- First comprehensive uncertainty analysis
- Identification of key source categories

The next steps are:

- Adaption of the national system according to Article 5.1 of the Kyoto Protocol
- Full implementation of the quality management system

DETAILS

International requirements regarding greenhouse gas emission inventories

Current requirements under the UNFCCC

Based on Article 4 Paragraph 1(a) of the United Nations Framework Convention on Climate Change the Parties shall develop, periodically update, publish and make available to the Conference of the Parties, in accordance with Article 12, national inventories of anthropogenic emissions by sources and removals by sinks of all greenhouse gases not controlled by the Montreal Protocol, using comparable methodologies as agreed upon by the Conference of the Parties. According to COP Decision 3/CP.5 [3] the Parties should use the UNFCCC guidelines on annual inventories (Document FCCC/CP/1999/7) [3] for reporting inventories due by 15 April each year, beginning in the year 2000. In Decision 4/CP.5 [3] in accordance with Decision 11/CP.4 [3] the Conference of the Parties decided that the UNFCCC reporting guidelines on national communications (Document FCCC/CP/1999/7) [3] should be used for the preparation of their third national communications due by 30 November 2001.

Future requirements

Two main requirements have to be fulfilled in the near future: the implementation of good practice guidance and the establishment of a national system.

To assist Parties in preparing higher-quality greenhouse gas inventories in which uncertainties are reduced as far as feasible and in which inventories are developed in a transparent, consistent, complete, comparable and accurate manner, the report entitled Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories (Good Practice Report) [4] has been prepared by the IPCC and adopted by the Subsidiary Body for Scientific and Technological Advice (Document FCCC/SBSTA/2000/5) [5]. This guidance document should be applied during the compilation of an emission inventory.

Good practice is a set of procedures intended to ensure that greenhouse gas inventories are accurate in the sense that they are systematically neither over- nor underestimated as far as can be judged, and that uncertainties are reduced as far as possible. Good practice covers choice of estimation methods appropriate to national circumstances, quality assurance and quality control at the national level, quantification of uncertainties, and data archiving and reporting to promote transparency.

According to Article 5.1 of the Kyoto Protocol each Party included in Annex I shall have in place a national system, no later than one year prior to the start of the first commitment period. A national system includes all institutional, legal and procedural arrangements made within a Party for estimating anthropogenic emissions by sources and removals by sinks of all greenhouse gases not controlled by the Montreal Protocol, and for reporting and archiving inventory information. The main objectives of national systems are to assist Parties to estimate their anthropogenic GHG emissions by sources and removals by sinks, to report these emissions as well as to ensure and improve the quality of their inventories. National systems should be designed and operated to ensure the transparency, consistency, comparability, completeness and accuracy of inventories.

General conditions in Austria

National and international obligations

As a Party to the Convention, Austria signed the UNFCCC on June 8, 1992 and subsequently submitted its instrument of ratification on February 28, 1994. The UNFCCC, which for Austria entered into force on March 21, 1994, obliges Parties to report data on emissions of greenhouse gases and removals by sinks within their sovereign territories. Therefore Austria has to prepare the national inventory report on an annual basis. The national inventory report contains detailed and com-

plete information on the inventory for all years from the base year to the year of the current annual inventory submission, in order to ensure the transparency of the inventory. It includes the information required under the common reporting format as well as detailed background information on references and sources of underlying data like emission factors and activity data, methodologies, assumptions and conventions underlying the emission and removal estimates, information on any recalculations, on uncertainties and on quality assurance/quality control (QA/QC) procedures implemented.

Apart from the obligations arising from the UNFCCC, Austria has to comply with other obligations as well:

- Austria's annual obligation under the UNECE Convention on Long-range Transboundary Air Pollution (CLRTAP) and its Protocols [6] comprising the yearly reporting of national emission data for SO₂, NO_x, NMVOCs, NH₃, CO, CH₄ and CO₂ as well as for heavy metals (Pb, Cd and Hg) and persistent organic pollutants (e.g. PAH, dioxins, furans).
- Austria's annual obligations under the European Council Decision 1993/389/EEC of 24 June 1993 for a Monitoring Mechanism of Community CO₂ and other Greenhouse Gas Emissions as amended by Council Decision 1999/296/EC [7].
- Obligation under the Austrian Air Quality Protection Act (Immissionsschutzgesetz-Luft, Federal Law Gazette I 115/1997) [8] comprising the reporting of national emission data for SO₂, NO_x, NMVOC, CO, heavy metals (Pb, Cd, Hg), benzene and particulate matter.
- Austria's future obligation according to Article 15 of the European IPPC Directive 1996/61/EC will be to implement a European Pollutant Emission Register (EPER). Article 15 of the IPPC Directive can be associated with Article 6 of the Aarhus Convention which refers to the right of the public to access to environmental information and public participation in the decision-making process of environmental issues [9].

The Austrian Air Emission Inventory

Irrespective of the dimensions of a country all international requirements have to be fulfilled. As Austria is quite a small country, resources are limited and have to be utilized to the best extent possible so that any duplication of work can be avoided. Therefore the Federal Environment Agency Austria having the sole responsibility for the preparation of Austrian emission inventories by law (Environmental Control Act, Umweltkontrollgesetz, Federal Law Gazette 152/1998) [10] has decided to prepare one comprehensive Austrian Air Emission Inventory (Österreichische Luftschadstoff-Inventur, OLI) comprising all air pollutants needed to fulfill the various national and international obligations. As a consequence the quality management system is also designed in a very flexible manner to allow for different degrees of quality control with regard to different obligations.

Currently, Austria is taking significant steps to have available a national emission inventory which qualifies for any kind of flexible mechanism like international emission trading as defined in the Kyoto Protocol. To ensure a high-quality greenhouse gas inventory in which uncertainties are reduced as far as feasible and in which data are developed in a transparent, consistent, complete, comparable and accurate manner, the following steps are taken:

- 1) Adaption of the national system according to Article 5.1 of the Kyoto-Protocol
- 2) Development and full implementation of a quality management system
- 3) First comprehensive uncertainty analysis
- 4) Identification of key source categories

The corresponding timetable is included in Table 1.

Table 1. Timetable for steps

Step		Date
1	Adaption of the national system according to Art. 5.1 of the Kyoto Protocol	
	1.1 Design of a concept for an adaption of the national system	April 2001
	1.2 Specification of quality of data issued by partners	April 2002
	1.3 Adapted national system fully operational at the Federal Environment Agency Austria	January 2003
2	Development and full implementation of a quality management system	
	2.1 Start	October 1999
	2.2 Development of a quality management system	1999 – 2001
	2.3 Quality manual	April 2001
	2.4 Full implementation of a quality management system	May 2001
	2.5 Accreditation as inspection body	2002
3	First comprehensive uncertainty analysis	
	Comprehensive uncertainty analysis	finished in May 2000
4	Identification of key source categories	
	4.1 Detailed identification of key source categories	April 2001
	4.2 Change of methods if necessary	2001 – 2005

Adaption of the national system according to Article 5.1 of the Kyoto Protocol

Currently the national system is adapted according to Article 5.1 of the Kyoto Protocol. The objective is to ensure the quality of the emission inventory to enable Austria to consistently estimate anthropogenic emissions of air pollutants by all sources and removals by all sinks of all GHGs, as covered by the Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories [11] and the Good Practice Report [4], in accordance with relevant decisions of the COP. Austria will also implement the requirements as included in a draft decision at COP 6 as far as there has been common agreement (Document FCCC/CP/2000/CRP.10) [2].

The Federal Environment Agency is by law the national entity with overall responsibility for the national emission inventory [10]. The national system will include all institutions whose data have a significant impact on the emission data and intensify their collaboration with the Federal Environment Agency. Among them are:

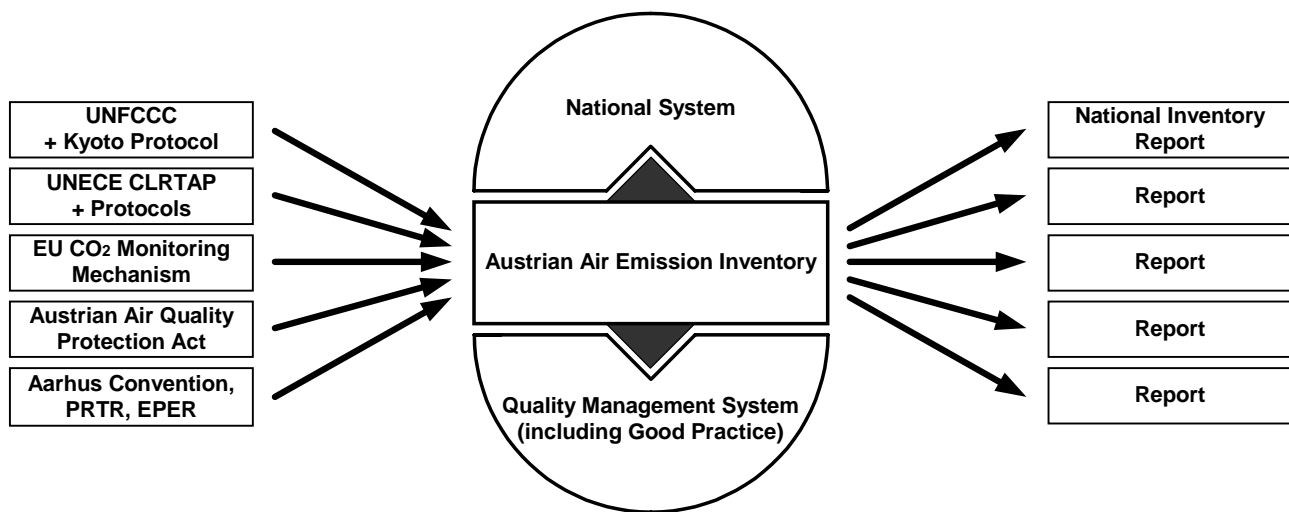
- Federal Provinces
- Austrian Federal Economic Chamber
- Statistics Austria
- Federal Ministry of the Environment
- operators of installations covered by the European IPPC directive

All processes related to

- collecting activity data, selecting emission factors and methods and developing emission estimates
 - identification of key source categories
 - estimating uncertainties
 - recalculation of previously submitted inventory data
 - quality management comprising quality assurance, quality control and quality objectives
 - verification of the inventory data
 - review of the emission inventory
 - official consideration and approval of the inventory
- are part of the quality management system as described below.

The emission inventory system as it is currently being adapted will have a structure as illustrated in Figure 1.

Figure 1. Structure of the future emission inventory system



Implementation of a quality management system

Quality assurance and quality control during the compilation of an emission inventory is of advantage in any case. As soon as the Kyoto Protocol has entered into force, however, a quality management system is essential to ensure the quality of emission data according to the requirements of the Good Practice Report as a basis for any kind of international emission trading. The Federal Environment Agency Austria has decided to implement a quality management system based on the EN 45004. The EN 45000 series [12] that has been drawn up as a quality management standard (as is the ISO 9000 series) has the objective of promoting confidence in those bodies performing testing, inspection or certification.

Inspection bodies

The European standard EN 45004 specifies general criteria for the competence of impartial bodies performing inspection, irrespective of the sector involved. It covers the functions of bodies whose work may include the examination of materials, products, installations, plants, processes, work procedures, or services, and the determination of their conformity with requirements, as well as the subsequent reporting of results of these activities to clients and – when required – to supervisory authorities. In the case of emissions inventories, inspection concerns the examination of air emissions and covers the collection of emission data or of data which are used to estimate them, their compilation and the check of their conformity with emission reduction limits.

For this purpose a quality management system based on EN 45004 is going to be implemented by the Department Emissions/Climate Protection/Noise Abatement of the Federal Environment Agency Austria. The quality management system takes into account recommendations of European and international documents such as the ISO 9000 series of standards and Guide EAL-G24 [13] as far as they are relevant for inspection bodies.

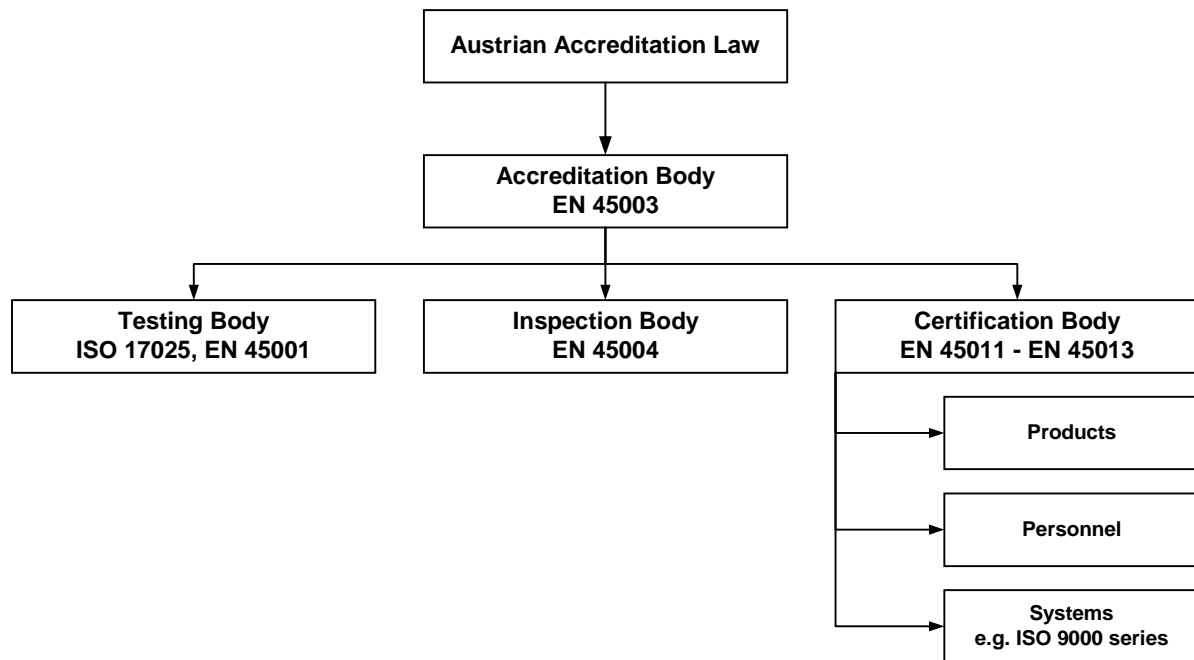
Accreditation Act

The EN 45000 series is implemented in the Austrian legislative system in contrast to the ISO 9000 series. The Austrian Accreditation Act (Akkreditierungsgesetz, Federal Law Gazette 468/1992 as amended by 430/1996) [14] regulates the accreditation of testing, inspection and certification bodies. It designates the Federal Ministry for Economic Affairs and Labour as accreditation body

and defines the conditions for granting, maintaining and extending accreditation and the conditions under which accreditation may be suspended or withdrawn, partially or in total for all or part of the testing, inspection or certification body's scope of accreditation. It requires re-assessment in the event of changes affecting the activity and operation of the testing, inspection or certification body, such as changes in personnel or equipment, or if analysis of a complaint or any other information indicates that the testing, inspection or certification body no longer complies with the requirements of the accreditation body.

In Figure 2 the interrelation between the Austrian Accreditation Act, the EN 45000 series and the ISO 9000 series is shown.

Figure 2. Interrelation between the Austrian Accreditation Act, the EN 45000 series and the ISO 9000 series



In our view the most important difference between the EN 45000 series and the ISO 9000 series is that accredited bodies under the EN 45004 are obliged to strict independence, impartiality and integrity in their activities. The personnel of the inspection body has to be free from any commercial, financial and other pressures which might affect their judgement. It has to be ensured that persons or organizations external to the inspection body cannot influence the results of inspections carried out. We feel that such a regulation is fundamental to guarantee that the emission data reflect the "true emissions" to the extent possible.

Accredited bodies are entitled to have the federation emblem and an accreditation mark as labels and their reports are official documents. Any corrections or additions to an inspection report after issue has to be recorded and justified.

Quality management system

The Federal Environment Agency Austria is currently implementing a quality management system based on the European standard EN 45004. This system is a process-based one and is illustrated in Figure 3.

The process-based quality management system consists of the following three process groups:

- Management processes (outer circle in Figure 3)
They comprise all activities that are necessary for the leading and control of the organization, e.g. organization and management, quality system, audits, management review, correction and prevention, personnel, equipment, external communication. The most important aspect with respect to organization and management is that the manager has to ensure that the personnel is free from any commercial, financial or other pressure which might affect their judgement.

Other relevant requirements affect personnel and equipment. The personnel must have appropriate qualification, training, experience and knowledge of the requirements of the inspections to be carried out. They shall have the ability to make professional judgements as to conformity with general requirements using examination results and to report there-on. As regards the equipment, mainly computers are used during the compilation of emission inventories. Any software applied has to be tested and confirmed in advance. Furthermore access authorization must be strictly limited to protect the integrity of data and to guarantee the confidence of data if necessary.

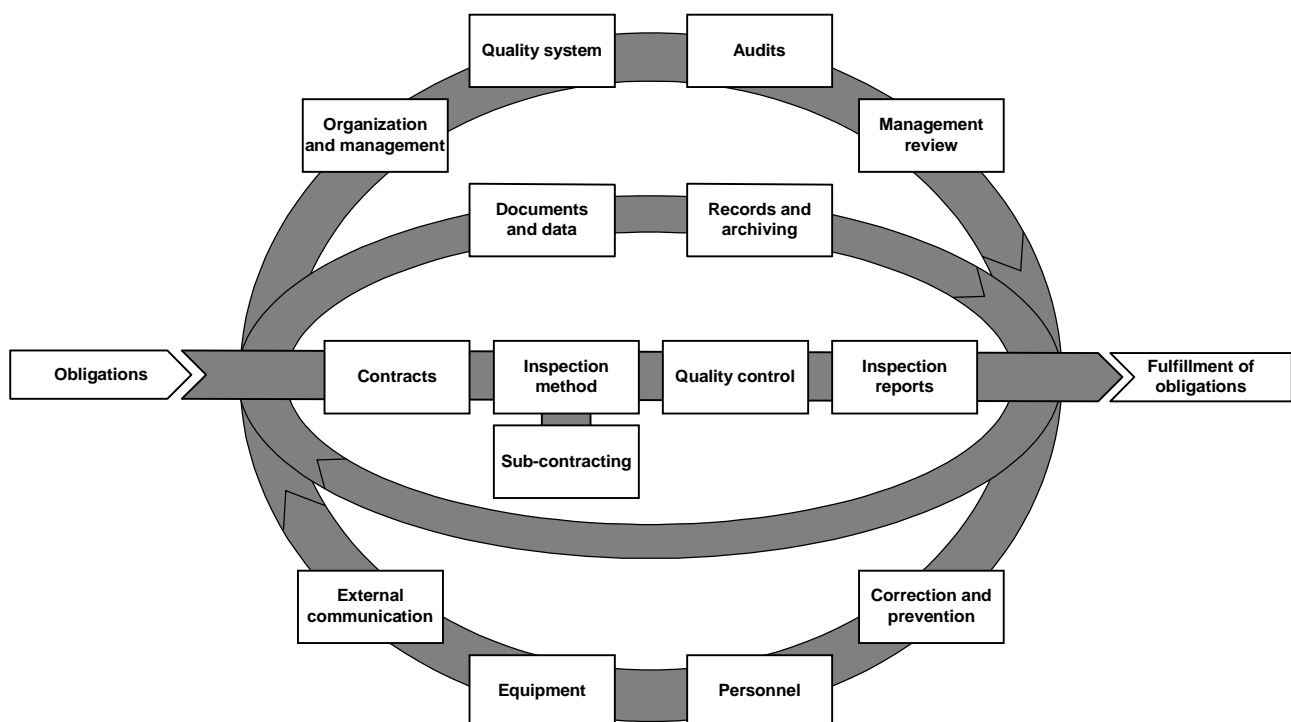
- Realization processes (straight line in Figure 3)**

These processes are the most important ones as they concern the compilation of emission inventories. It starts with a contract control system which ensures that the methods to be used are selected in advance taking into account that for key source categories the most detailed method should be applied. The inspection method consists of two steps, the data collection and the application of methods for the estimation of emissions. The Federal Environment Agency currently uses IPCC methods [10], CORINAIR methods [15] and specific methods. The latter are country-specific and have to be fully documented and validated. All emission data are subject to appropriate quality control checks and data verification before they are released in an inspection report.

Normally an inspection body has to perform the inspections itself. When it sub-contracts any part of the inspection, however, it must ensure that the sub-contractor complies with the standard EN 45004.
- Supporting processes (inner circle in Figure 3)**

These processes support both management and realization processes and comprise a system for control of all documents and data as well as for records and their archiving.

Figure 3. Process-based quality management system (the outer circle corresponds to management processes, the straight line to realization processes and the inner circle to supporting processes)



All relevant requirements addressed in the Good Practice Report are included in our quality management system.

First comprehensive uncertainty analysis

A first comprehensive uncertainty analysis was finished by Winiwarter *et al.* [16] in 2000 regarding the greenhouse gases CO₂, CH₄ and N₂O for the years 1990 and 1997. The work was not performed internally by the Federal Environment Agency Austria but by the Austrian Research Centers Seibersdorf to allow for independent assessment. There were four steps:

- Step 1: Compilation of emission sources
- Step 2: Prioritization and first estimate of uncertainty
- Step 3: Uncertainty assessment for input parameters
- Step 4: Monte Carlo analysis

Procedure

Step 1: Compilation of emission sources

Emission sources had to be compiled to describe emissions in terms of statistically independent parameters. As the Austrian Air Emission Inventory is based on the CORINAIR SNAP Code these source categories had to be transformed to IPCC source categories first. Source categories that use the same emission factors based on common assumptions were aggregated.

Step 2: Prioritization and first estimate of uncertainty

A prioritization of input parameters was performed using three different approaches in order to estimate the most important emission sources and to focus further assessment. One approach was based on the results for the UK as described by Charles *et al.* [17], another approach was based on the results for Norway as described by Rypdal [18]. In case of qualitative estimates of uncertainty (like low, medium and high) as it was for Norway, these categories were transformed to quantitative values (low = 5%, medium = 30%, high = 80%). Based on the data for the UK and Norway a first estimate of uncertainty was made. The third approach was made according to the Good Practice Report, Chapter 7 (Methodological Choice and Recalculation) [4].

Step 3: Uncertainty assessment for input parameters

Any emission source that was relevant in at least one of the approaches described in step 2 was analyzed with regard to its uncertainty. In Table 2 the corresponding emission sources are listed. A detailed uncertainty analysis was performed by quantitative estimation, by literature research or by expert judgement. In the latter case the experts had to refer to literature to allow that their uncertainty estimate was taken into account.

Regarding uncertainty two aspects were considered: systematic uncertainty and random uncertainty. Random uncertainty covers the fluctuation of a large set of measurements, which may include both random uncertainty of the measurements and the natural variability of a parameter. A systematic error is the deviation of a result from "reality", a deviation which may be caused by a systematically wrong estimate as well as by the omission or false interpretation of certain data or statistics. The main difficulty in dealing with the systematic error is that it is normally not known almost by definition. Once a systematic error becomes apparent, it is possible to account for it and eliminate it.

Step 4: Monte Carlo analysis

The uncertainty data as determined in step 3 were fed into a Monte Carlo analysis. All input parameters were varied to obtain overall uncertainties for each of the greenhouse gases CO₂, CH₄ and N₂O and for their combination as CO₂ equivalents (using the values for greenhouse gas warming potentials). The uncertainties for the underlying data (activities and emission factors) were calculated as well.

Results

Table 3 shows the values for the total uncertainty including systematic uncertainty and random uncertainty and Table 4 corresponds to the random uncertainty. The total uncertainty reflects

the current situation, whereas the random uncertainty can be achieved under ideal conditions with the inventory techniques currently available.

Regarding the individual greenhouse gases the emissions of CO₂ have a very low uncertainty whereas the uncertainty for N₂O is quite high. The overall relative uncertainty was calculated for the year 1990 at 9,8% and for the year 1997 at 8.9%. The reduction is due to the increase in CO₂ emissions from the use of fossil fuels. These CO₂ emissions dominate the total greenhouse gas emissions and have a very low uncertainty in comparison to other greenhouse gas emissions so that their uncertainty dominates the overall uncertainty. The random uncertainty was calculated for the year 1990 at 4,5% and for the year 1997 at 3,8%.

More details are described in Winiwarter *et al.* [16]

Table 2. Most relevant emission sources with regard to uncertainty

Emission Source	CO ₂	CH ₄	N ₂ O
Energy conversion	×		×
Industry	×		
Transport	×		×
Energy – other sources	×		
Fugitive emissions – gas and liquid fuels	×		
Industrial processes – cement	×		
Metal industry processes – iron and steel	×		
Enteric fermentation – cattle		×	
Agricultural soils		×	×
Abandonment of managed lands	×		
Solid waste disposal		×	

Table 3. Total uncertainty of emissions data (emissions given in Tg CO₂ equivalent per year, uncertainties given as percentage of the mean)

Total uncertainty		CO ₂	CH ₄	N ₂ O	Total GHG emissions
1990	Mean	63,20	9,48	6,59	79,27
	Standard deviation	0,73	2,29	2,95	3,89
	2σ	2,3%	48,3%	89,6%	9,8%
1997	Mean	67,76	8,34	6,81	82,91
	Standard deviation	0,71	1,98	2,93	3,67
	2σ	2,1%	47,4%	85,9%	8,9%

Table 4. Random uncertainty of emissions data (emissions given in Tg CO₂ equivalent per year, uncertainties given as percentage of the mean)

Random uncertainty		CO ₂	CH ₄	N ₂ O	Total GHG emissions
1990	Mean	63,54	11,41	1,99	76,94
	Standard deviation	0,30	1,64	0,26	1,73
	2σ	1,0%	28,7%	25,6%	4,5%
1997	Mean	68,05	10,02	2,27	80,34
	Standard deviation	0,34	1,43	0,27	1,53
	2σ	1,0%	28,5%	23,9%	3,8%

These data are important as an input to the emission inventory improvement program.

Identification of key source categories

The uncertainty analysis as described above has given a first estimate indicating which emission sources are to be considered as key source categories. However, the greenhouse gases HFC, PFC and SF₆ are also included in the identification of key source categories which is done by the Federal Environment Agency Austria. According to the Good Practice Report, a key source category is one that is prioritised within the national system because its estimate has a significant impact on a country's total inventory of greenhouse gases in terms of the absolute level of emissions, the trend in emissions, or both. The method used to identify the key source categories is described in the Good Practice Report, Chapter 7 (Methodological Choice and Recalculation) [4].

In Table 5 the key source categories as identified for the year 1999 are listed. These key source categories cover 96% of total greenhouse gas emissions. Whenever a method for the estimation of emissions of a key source category is not consistent with good practice guidance for that source category the method is planned to be changed. To this end an emission inventory improvement program will be developed to allow for stepwise improvement of emission data. It is planned that this program will introduce the methods with the lowest uncertainty for key source categories until 2005.

Table 5. Key source categories based on emission data for the year 1999

Index IPCC 1996	Emission source	CO ₂	CH ₄	N ₂ O	HFC	PFC	SF ₆
1 A 3 diesel	Energy_Fuel Combustion_Transport	×					
2 C 1	Industrial Processes_Metal Production_Iron and Steel	×					
1 A 4 liquid	Energy_Fuel Combustion_Other Sectors	×					
1 A 3 gasoline	Energy_Fuel Combustion_Transport	×					
1 A 2 gaseous	Energy_Fuel Combustion_Manufact. Industries and Construction	×					
1 A 1 gaseous	Energy_Fuel Combustion_Energy Industries	×					
6 A	Waste_Solid Waste Disposal on Land		×				
1 A 1 solid	Energy_Fuel Combustion_Energy Industries	×					
1 A 4 gaseous	Energy_Fuel Combustion_Other Sectors	×					
4 A 1	Agriculture_Enteric Fermentation_Cattle		×				
1 B 2 a	Energy_Fugitive Emissions from Fuels_Other_Oil	×					
2 A 1	Industrial Processes_Mineral Products_Cement Production	×					
1 A 1 liquid	Energy_Fuel Combustion_Energy Industries	×					
1 A 2 liquid	Energy_Fuel Combustion_Manufact. Industries and Construction	×					
1 A 4 solid	Energy_Fuel Combustion_Other Sectors	×					
4 D	Agriculture_Agricultural Soils			×			
2 F	Industrial Processes_Consumption of Halocarbons and SF ₆				×		
4 D	Agriculture_Agricultural Soils		×				
2 F	Industrial Processes_Consumption of Halocarbons and SF ₆						×
1 A 2 solid	Energy_Fuel Combustion_Manufact. Industries and Construction	×					
2 B 1	Industrial Processes_Chemical Industrie_Ammonia Production	×					
6 D	Waste_Other Waste		×				
1 A 3 gasoline	Energy_Fuel Combustion_Transport			×			
3	Solvent and other Product Use	×					
2 A 7 b	Industrial Processes_Min. Products_Other_Magnesit Sinter Plants	×					
2 F	Industrial Processes_Consumption of Halocarbons and SF ₆					×	
1 A 2 other	Energy_Fuel Combustion_Manufact. Industries and Construction	×					

CONCLUSIONS

Austria anticipates the Kyoto Protocol to enter into force in the near future. Therefore it prepares its emission inventory to fulfill all relevant requirements which are seen as a prerequisite to make use of the Kyoto mechanism, like international emission trading, without undermining the integrity of the Kyoto Protocol.

The adaption of the national system according to Article 5.1 of the Kyoto Protocol is currently being designed by the Federal Environment Agency Austria that has the sole responsibility for the compilation of Austrian emission inventories. The main objective of the national system is to ensure the transparency, consistency, comparability, completeness and accuracy of the emission inventory. It will include all institutional, legal and procedural arrangements made within Austria for estimating anthropogenic emissions by sources and removals by sinks of all greenhouse gases and for reporting and archiving inventory information. Most requirements are to be implemented by means of a quality management system. The adaption of the national system is expected to be finished by 2003.

The quality management system currently implemented by the Federal Environment Agency Austria is based on the European standard EN 45004 because this standard is the only one being incorporated in the Austrian legislative system and ensuring strict independence, impartiality and integrity of the inspection body in its activities. All relevant requirements addressed by the IPCC report on Good Practice Guidance and Uncertainty Management are included in the quality management system. Accreditation as inspection body is planned for 2002. Appropriate methods in line with the Good Practice Report for all key source categories should be implemented by 2005.

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 - *4/CP.5 Guidelines for the Preparation of National Communications by Parties included in Annex I to the Convention, Part II: UNFCCC Reporting Guidelines on National Communications* (referring to Document FCCC/CP/1999/7)
 - *Document FCCC/CP/1999/7 Review of the Implementation of Commitments and of other Provisions of the Convention – UNFCCC Guidelines on Reporting and Review*
 - *11/CP.4 National communications from Parties included in Annex I to the Convention*
 - *Document FCCC/CP/2000/CRP.10 Preparations for the First Session of the Conference of the Parties serving as the Meeting of the Parties to the Kyoto Protocol (Decision 8/CP.4) – National Systems, Adjustments and Guidelines under Articles 5, 7 and 8 of the Kyoto Protocol*
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- ISO/IEC 17025 (General requirements for the competence of testing and calibration laboratories) replacing EN 45001 (General criteria for the operation of testing laboratories)
 - EN 45002 (General criteria for the assessment of testing laboratories)
 - EN 45003 (General criteria for the laboratory accreditation bodies)
 - EN 45004 (General criteria for the operation of various types of bodies performing inspection)
 - EN 45011 (General criteria for certification bodies operating product certification)
 - EN 45012 (General criteria for certification bodies operating quality system certification)
 - EN 45013 (General criteria for certification bodies operating certification of personnel)
 - EN 45014 (General criteria for supplier's declaration of conformity)
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KEYWORDS

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